Socio-cultural design and interactive governance

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ABSTRACT

The aim here is to address the questions corresponding to the emergence and the evolution of groups, of communities within **a population of heterogeneous agents** so as to describe the overcoding processes (as manipulation of the codes themselves, **translation procedures**) which characterize the **creative behaviours** that can be attributed to agents in the framework of **complex mediations** issuing from an interdisciplinary approach relevant to negotiation through the identification of the **heuristics** that they use.

At this level the notions of cognitive or cultural shortcut and strategic shortcut as well that of the autonomy turn out to be particularly of interest since while taking into account the socio-cultural context to design the complex relations built inside the population, they enable us t**o set the foundations relative to the mechanisms that characterize the procedures of interactive governance in regard to the criteria of sustainability.**

KEYWORDS: cognitive, cultural and strategic shortcuts, complexity, heuristics, proximity, interactive governance, sustainability

Références JEL : B49, D71, D74, L29

In the general sense, the aim here is to address the questions corresponding to the emergence and the evolution of groups, of communities within **a population of heterogeneous agents** so as to describe **the mechanisms of co-construction of compromises and of consensus** operating at the level of the i**nteractive governance** which concerns the public policy. Attention will be paid particularly to the **cognitive and cultural aspects** corresponding to the coding processes and to the overcoding processes which characterize the **creative behaviours** that can be attributed to agents in the framework of **complex mediations** issuing from an interdisciplinary approach relevant to socio-cultural motivations and negotiations.

With reference to Buchanan (1954) it is important to take into account "the idea of social rationality" since "rationality or irrationality as an attribute of the social group implies the imputation to that group of an organic existence apart from that of its individual components", with the knowledge that "there is no particular reason why such plurality of motivations cannot be accommodated within a social choice framework with more richly described social states and more articulated characterization of individual choices and behavior" (Sen, 1995).

In the same way, in the article by Sen(2004) it must be observed how individuals have identities of multidimensional nature making them adhere to different social groups which takes us to the notion of social identity and thus it enables us to consider that the agents do not behave simply in an egocentric manner but on the contrary that they participate in the social game of identifying themselves with groups (at least partially) of co-constructing projects and of elaborating compromises or consensus within the limits of criteria of sustainability.

These elements are in keeping with the multidimensional space which is not universal in character in relation to different cultures and hence it is incomplete and therefore it is within this context by trying to provide content to the notion of **"social cognition"** that we can confront the notion of social belief (Orléan, 2002) and the development of complex socio-cultural systems; the point is to try to understand how **different modes of articulation of cognitive activities and the creative behaviours based on individual and collective representations participating in the co-construction of ephemeral structures** emerge and function. Indeed Grannovetter (1994) deems it necessary to reformulate "the problematic of economic institutions as being the result of the mobilisation of resources for a collective action" knowing that "the economic action (like any other action) is socially situated and cannot only be explained through simple individual motives, it is embedded in a network of personal relations more than its likeliness to come from atomised actors...."; in this manner Granovetter adheres to the idea according to which the **economic institutions** do not emerge automatically in a shape determined by external circumstances but are **constructed socially** and as it has been mentioned they give rise to creative behaviours as such making possible complex mediation and diffusion processes .

I SOCIO-CULTURAL DESIGN AND IDENTITY

From the methodological point of view, modelling calls for the notions of connexity of the theory of graphs – at this point **mediated connexity** will be dealt with – and of pre-topology, the notion of adherence taking into account **the architecture of relations here linked to the idea of embedded networks** with reference to Granovetter.

First of all the **identity agents** must be translated through the set of the codes or languages that they use to construct the socio-cultural representations of their environment and their goals (Boltansky and Thévenot, Callon, Simon). Thus the **cognitive individual spaces** as well as the binary relations that link these agents are defined based on the **interactionist paradigm** thus lending content to the notion of **cognitive and cultural proximity** in reference to Nooteboom. With help from the concept of **cognitive chain**, it is considered that the agents are **cognitively situated,** the **processes of cultural translation** taking us to the notions of adherence and of closure as pre-topology denotes.

Let us consider a group of individuals (a population) P evolving and acting in a socio-cultural environment of a multidimensional nature. The point of departure is the hypothesis that has already been considered by Orillard according to which in fact these agents perceive the messages, in this case of socio-cultural nature, relative to the set of the states of the world noted as E (supposing that E is finite) in a dispersed manner, which means at the start they are inexpressible, and use different codes so as to make them intelligible.The cognitive processes used at the level of socio-cultural apprehension of the states of the world in which they evolve, arise from complex mechanisms that have the prior goal to establish veritable engineering set up of cognition within the population that conditions the construction of strategic alliances relative to the interactive governance of actions at the level of the social game.

This construction at its start rests on the principle of procedural rationality as Simon(1982) means, identification of groups and the co-construction of projects.
Here methodological individualism and holism do not have their place amongst the fundamental hypotheses. Therefore, the basis will be the interactionist hypothesis characterized by a group of relations from individual to individual, individual to group, group to group. These relations, these links are defined through the spaces basically specific to agents, and to groups, spaces of reference which must hitherto be described.

It is suitable to situate the agents now, the deciders in the spaces of multiple dimensions since the characteristics of different socio-cultural spheres will be taken into account (Boltanski and Thévenot). Since the object of this reflection rests on the principle of action and on interactionism therefore on the construction of relations between agents and groups, the corresponding information must be rendered intelligible. It is from this point of view that the agents will use different codes or languages relative to different cultures in order to express themselves. It is without doubt necessary to remember here what we mean by **code** that is to say a **system of manipulation of symbols**. It is through these codes used by agents that the cognitive spaces of reference relative to the socio-cultural world have been studied here.

Let us note that:

-on the one hand, given the fact that we consider here that the cognitive capacities of actors are limited, it has to be admitted they are incapable of translating messages or observations received by using a great number of codes
-on the other hand, because of different cultures, it seems reasonable to consider that two different individuals may not make use of the same codes; even if their objective is to understand and act together at least partially, which takes us to the complex socio-economic system in which the actors evolve and participate in the interactive governance characteristic here to policies for sustainable development, to the social game, and to its consequences concerning public policies.

In all, from a group of agents of different identities in all likelihood, we obtain a group of spaces of multidimensional references in accordance to which the representations of the world of some and of others will be incomplete, thus reflecting well the socio-cultural heterogeneity of agents.

Suppose P a population of heterogeneous agents in the sense that the actors do not use the same codes to express themselves in accordance with the afore- mentioned specification and E the set of states of the world.

Let us consider an individual i belonging to P, we note **E_i as the cognitive space relative** to this agent that is to say the resultant from the use of a set of codes C_i (or languages issuing from different logics, of different cultures that characterize identity and in the same way heterogeneity of agents) let us suppose that $C_i \neq \varnothing$ is finite.
If E_i is the set of the states as they have been coded by the agent i then we note $\underline{E_i}$ the states of the world deemed admissible by this agent taking into account the criteria relative to the hypotheses of sustainable development, which then enables us to define strategic autonomy of a group of agents.

At this level a parallel can be drawn between the notion of code and that of **script** or codebook in the sense of Nooteboom or of a translation in sense of Callon knowing well that in the first case the codes are useful to the actor in order to construct his system of representation (of environment to which he responds, in the game he participates) while in the second case Nooteboom refers more to the articulation of knowledge, competence, and actions.Then the incompleteness of individual cognitive spaces emerge from the fact that all the agents do not use the same codes. In such situations the fact that two agents are able to dialogue is the result of the process of translation in place .

From then on a cognitive graph relative to population P can be drawn, generalising the idea of a **cognitive chain,** the heterogeneity of agents appearing clearly.

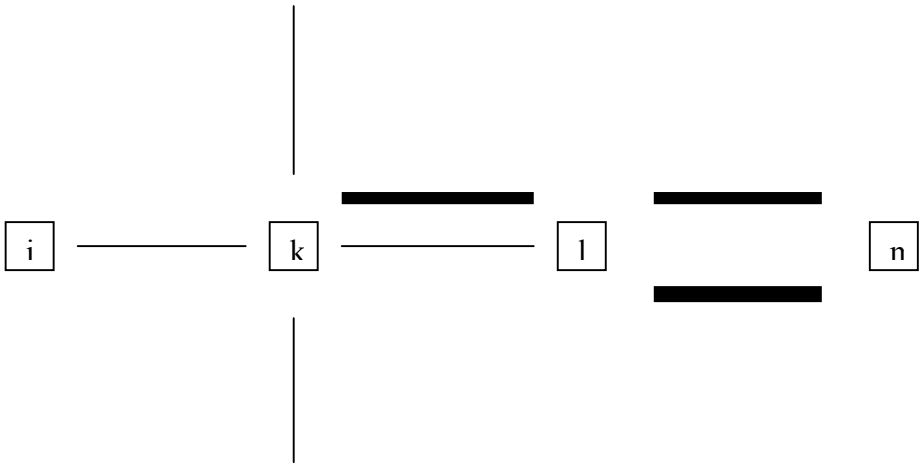

Figure 1:The individuals are therefore " cognitively and culturally situated".

The definition of cognitive and cultural proximity between two individuals depending here directly on the cognitive graph, rests on the existence of a cognitive chain between the two, (particular attention could be given to the shortest of these chains as it takes us to the notion of geodesic distance).
In fact quite many studies are based on the notion of proximity which may be accepted or not according to different accounts (Bellet, Kirat, Langeron), the pre-topology being an interesting tool when we want not only to refer to individual to individual relations but also to individual to group, group to group relations – it enables us to illustrate the **" cognitively and culturally close"** and **"cognitively and culturally heterogeneous"** notions.

The emergence of groups within the population will therefore be conditioned by the property of generalised connexity (because it enables different codes to intervene) , that is to say, the possibility to link the agent i to agent j passing through the intermediaries that guarantee the translation (Akrich, Callon & Latour 2006) of representations that play the role of cognitive mediators.

The emergence of a complex socio-cultural system can be modelised in the following manner:

Definition 1 (interpersonal relation):

i Rj ⇔ i and j know each other and use at least one common code

In this case i and j are said to be "cognitively and culturally close" as far as the exchange of information takes place through the intermediary of common codes.

First we will direct our interest to the cognitive and cultural proximity and then the idea of embeddedness of Granovetter where the agents are situated cognitively and culturally.

These type of representations allow us to propose an illustration for the idea of proximity corresponding to the shortest path relative to the graph of the relation R to go from i to j, an absolutely interesting concept when it is envisaged in a general manner from a binary relation which could be of a spatial, relational, and cognitive nature, to this effect different works will be referred like Bellet, Kirat and Langeron .

But also this will allow us to introduce the concept of cognitive and cultural shortcut in order to take into account the formation of alliances and the emergence of groups corresponding to the utilisation of a higher or lower number of codes used in common and the existence of cognitive intermediaries thus connecting the notion of translation to which we have referred when we introduced the work of Callon and of embeddedness of Granovetter.
The quality of a shortcut, of the translation depends both on the number of intermediaries and on the number of codes that the agents have in common.

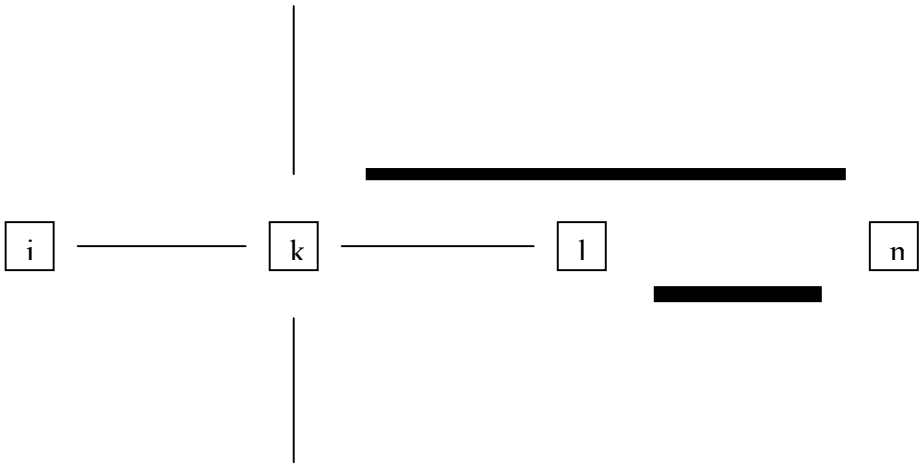

Figure 2: Cognitive and cultural shortcut

Definition 2 (emergence of groups):

$-\forall A \neq \varnothing \subset P$:

(*) if A is connected according to R (A is said **cognitively and culturally autonomous**) hence adh (A) = { j / $\exists$ i $\in$ A et j R i}

(**) if not adh (A) = A and A is closed

(***) if $\cap_{i \in A} C_i$ is empty, A is said **cognitively and culturally heterogeneous**

-If A = $\varnothing$ then adh (A) = $\varnothing$

The pre-topology thus defined is not of type V (see appendix)

It is important to specify here that the relation R and the connexity do not necessarily involve the intervention of the same code thus signifying that the agents belonging to A do not necessarily have the same individual cognitive space for example but on the contrary some intermediaries allow to pass from one code to another and as such pass from one cognitive space of an agent to the others cognitively, culturally and strategically.

The importance of taking into account the possibilities of translation within the population is linked to the notion of social cognition relative to the processes of emergence of the complex socio-economic system.

Of course the combinations of codes of form $C^1 o\ C^2 o\ C^3$ exist both as manipulations of codes or processes of translation, which is also a source of ambiguity, creativity and of wealth in the sense that they make it possible for all to construct intelligible representations from messages which by definition are heterogeneous.

II ALLIANCES, EPHEMERAL INSTITUTIONS

It is thus clear that the reference to the processes of **overcoding (as manipulations of codes themselves**) allows to widen the meaning further, in the context that is of interest to us here, that is to say, the modelisation of collective decision processes; the autonomy of a group from a cognitive and cultural point of view , as it has been said before, is based on the connexity , the strategic autonomy for those groups rests on the existence of a combination of coding processes such as the states to which reference will be made by the group satisfying all the members, that is to say:

there is a set of coding processes C^1, C^2,……. C^k as $\forall$ k , $C^k \subset \cup_{i\in A} C_i$ and $\underline{E}_A$ a group of the states of the world translated through the codes thus selected as $\forall$ i, $C^1(C^2(\ldots\ldots. (C^k (\underline{E}_A))))$ is considered as a set of possible projects by i referring to $\underline{E}_i$ with $\underline{E}_i \subset E_i$, $(C^k (\underline{E}_A)$ corresponding to the representation of $\underline{E}_A \subset E$, built using the coding process C^k)

Therefore, it is of great importance to find the shortest combination possible of coding processes which correspond to the notion of strategic shortcut and here we refer to the lowest number of intermediaries necessary (A') upon which the co-construction of a project rests (which enables us to lend a content to the notion of procedural rationality in the sense of Simon and to differentiate between the notion of social belief introduced by Orléan) a project acknowledged to be accepted by all the members of A .

The most important thing now is that a relation has been clearly established between the notion of decoupling in the sense that the cognitive and cultural autonomy and the strategic autonomy rest on the selection of a certain number of coding processes that are manipulated in order to obtain a project emerging from the negotiations that correspond to the idea of White (2008) according to which a certain number of coding processes and relations will be set aside and used to co-construct projects.In real fact this decoupling mechanism correspond to the construction of a codebook common to the agents knowing that when $A \subset P$ is cognitively and culturally autonomous, the set C_A will be defined in the following manner:

$C_A \subset \cup_{i\in A} C_i$ with $C_A = \{ C^1, C^2,\ldots\ldots. C^k \}$ corresponding to the shortest heuristic in the selection of the translation processes.
Here we illustrate the idea of collective cognition which is compared to the collective belief in sense of Orléan (2002) by defining A'.

In fact, the concept of shortcut at the level of relations between agents is introduced, thus we light upon the notion of autonomy and this at two levels :

-at the cognitive and cultural level, the notion of **cognitive and cultural shortcut** enables us to address the question relative to cognitive and cultural autonomy of a group of heterogeneous agents and to define the corresponding collective cognitive spaces.

-at the strategic level, the notion of **strategic shortcut** enables us here, starting from the idea of strategic autonomy, to describe the processes of **co-construction of projects, of compromises or of consensus, through identification of A' et of heuristics used and corresponding to C_A , in terms of procedural rationality** according to Simon in order to address the questions relative to the interactive governance characteristic to the **complex socio-cultural systems.**

It is thus that content is provided to the idea of socio-cultural design by defining the identity of emerging groups related to the notion of ephemeral socio-economic institutions thanks to translation mechanisms (through the overcoding processes – Sfez-) and to the complex mediations set in place leading to the adoption of a codebook. **These ephemeral institutions are indeed constructed socially and situated socially** (Granovetter) just because the notions of shortcut and of autonomy, in the cognitive and cultural as well as strategic sense, rest on **the notion of decoupling** based on White relative to **the heuristics of selection** of relations constituting the cognitive chains and of overcoding processes.

In the public policy context relative to the sustainable character of decisions, the alliances take us back to cognitively and culturally autonomous groups where it is important to get closer to the "common vision that guides the heterogeneous actors" (Cohendet, 2003) in order to introduce the notion of strategic autonomy.
By definition two particular cases can be envisaged relative to C_A as a whole set of codes, this makes it possible to define cognitive space relative to A, by taking the autonomous processes likely to have a strategic content in relation to the population P and the complex socio-economic system, if A is autonomous the following cases can be envisaged :

-we could have $C_A = \cap_{i\in A} C_i$ which characterizes a relatively homogeneous group of agents (which have at least one common code)
-or either $C_A = \cup_{i\in A} C_i$ knowing that in this case we want to exploit at best wealth in terms of knowledge of members A, heterogeneity a priori of agents is therefore able to be compensated by the presence of mediators who by articulating the codes of ones with the others, play the role of overcoders in the sense of Sfez (1993) and participate in the diffusion of information.

In the general sense we have :

$$\cap_{i\in A} C_i \subset C_A \subset \cup_{i\in A} C_i$$

Thus C_A can be linked to codified knowledge through the intermediary of which the cognitively autonomous group A can be (through the intermediary of some of the members – A'- by making the codes play between themselves that is to say by using procedures of overcoding, as it has been described above to highlight the projects, co-constructed compromises making the help of some codes repetitively very necessary) identified at the level of population P. In this case it is to do with social cognition and interactive governance. At this level the smallest path can be identified in such a way that all those who adhere to A consider the project satisfactory thus bringing into play the notion of strategic shortcut and that of decoupling according to White.

These cognitively, culturally and strategically autonomous groups will be considered as ephemeral institutions relative to the complex socio-cultural system by which we are concerned and which will be effected by the learning process that will be addressed here below.

At this level this research can be situated, in particular, compared to:

- the developments relative to the cognitive complementarity of agents as defined by Cowan, Jonard and Zimmermann through a function of production of knowledge.

- here we will concentrate on the works relative to the identification and the way the communities operate (Amin and Cohendet), the mechanisms of emergence and the articulations at the global level relative to social organisation (as community of communities) here being modelled with the use of the function of adherence and the processes of overcoding in order to effectively take into account the creativity of agents relative to mechanisms of co-construction.

III INTERACTIVE GOVERNANCE AND LEARNING

Hence finally the last step takes us to the questions relative to **the processes of diffusion and learning linked to the identity of groups** that have emerged and to the processes of overcoding that have been effectively set up at the level of the co-construction of compromises or of generalised consensus. The rules of learning rest on the belongingness of the agents being most of all heterogeneous to certain groups, certain communities and as such condition the development of ephemeral institutions. At this level the notions of cognitive and cultural shortcut and strategic shortcut as well that of the autonomy turn out to be particularly of interest since while taking into account the heterogeneity of agents and groups, they enable us t**o set the foundations relative to the mechanisms that characterize the procedures of interactive governance in regard to the criteria of sustainability.** Identification of cognitively, culturally and strategically autonomous groups, and of heuristics (through A') set up leads us indeed, through the overcoding processes, to address the study of interaction between these groups, these communities, these institutions and the articulations of projects co-constructed thus prolonging the work presented in Orillard (2005,2008).

Let us suppose then that we move from time t to time t +l, a set of groups cognitively, culturally and strategically autonomous having emerged from time t, a number of links appear in t + 1 because of rules of learning and diffusion of knowledge stated by:

$$C_{i,t+1} = C_{i,t} \cup (\cup_{A/i \in A} C_A)$$

By generalising the previous construction we obtain (note: the indications t and t+1 are omitted in order to render the writing light)

Definition 3 (individual to individual, individual to group, group to group relations):

Suppose A et A°, $A \subset P$, $A^\circ \subset P$, two autonomous groups (as defined above) at time t (non-reduced both to be singletons)

We set down : $A\ R'\ A^\circ \Leftrightarrow C_A \cap C_{A^\circ} \neq \varnothing$

knowing that C_A and C_{A° are public knowledge inside P, it is here that interactive mechanisms of governance are found again, in particular between groups A and A° through the projects that they have constructed corresponding to $\underline{E}_A$ and $\underline{E}_{A^\circ}$

If one of the two groups for example A is reduced to a singleton i we can extend the definition by setting down: $C_A = C_i$.

Abiding by these definitions, we have for example the following graph :

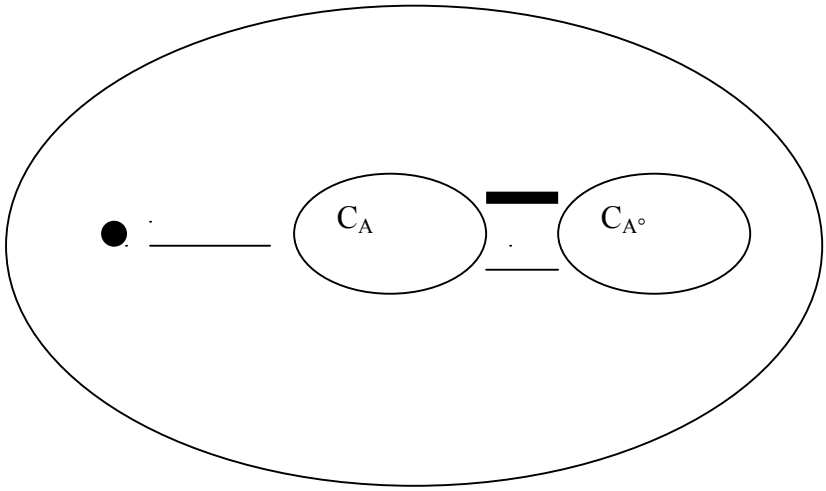

Figure 3: complex socio-cultural system

Definition 4 (complex socio-cultural system evolution): In fact definition 1 is generalised here :
-Suppose $\tilde{A} \neq \varnothing$, $\tilde{A} \subset P$,

(*)if $\tilde{A}$ is connected according to R' then
adh $(\tilde{A}) = \{A^{\circ\circ} \subset P / \exists\ A^\circ$ autonomous $\subset \tilde{A} : A^{\circ\circ}\ R'\ A^\circ\}$

(**)if not adh $(\tilde{A}) = \tilde{A}$ and $\tilde{A}$ is closed

-if $\tilde{A} = \varnothing$ then adh $(\tilde{A}) = \varnothing$

This pre-topology generalises the defined structure departing from definition1. It allows to realize the fact that collective cognitive learning at the level of the passage from the autonomous groups A in t to the autonomous group Ã in t +1 results from embedded relations in the sense of Granovetter (1985) in a more global sense which makes the role played by the sub-groups A' obvious who at the inception are responsible for the co-construction of projects through the heuristics chosen at the level of the processes of overcoding which in fact is characteristic of complex mediation mechanisms as well as interactive governance within the communities. The procedures of learning participate in the development of compromises and in the research for consensus.

It is no longer by definition the question of stability and of efficiency as it is envisaged in work relative to the economics of networks but of evolution from heuristics referring to the notion of procedural rationality.

CONCLUSION :

We have thus participated in the construction of a framework that enables us to take into account the development of complex socio-cultural systems by centering our study on the modelisation of complex mediation procedures based on the identity of agents and on relations of diverse nature that occur between communities by definiton heterogeneous, extending the work of Orillard (2005,2008) and by addressing some relatively new questions such as about the identity of socio-cultural actors from a pluridisciplinary point of view.

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APPENDIX

A 1: Let a set P and an application from **P**(P) to **P**(P) such as :
adh ($\varnothing$) = $\varnothing$
$\forall$ A, A $\subset$ P adh (A) $\supset$ A
Then the couple (P, adh) is called a pre-topological space.

A 2: $\forall$ A, A $\subset$ P, A is said a closed set if adh(A) = A.

A3: the couple (P, adh) is a pre-topological space de type V if and only if:
$\forall$ A, A $\subset$ P and $\forall$ A', A' $\subset$ P
if A $\subset$ A' then adh (A) $\subset$ adh (A')